



CRISPY/CAS9
A NOTE-BY-NOTE DISH INSPIRED BY GENE
EDITING TECHNOLOGY
TOPIC: FOOD FOR THE FUTURE

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*Advanced Molecular Gastronomy
TFCS9025*

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1. INTRODUCTION

Our society faces a major challenge regarding the future of food, particularly in terms of availability, sustainability, and the need for innovation to meet global demands. As an answer to this, developments such as note-by-note cooking and molecular gastronomy have emerged as a bridge between food science and gastronomy (Burke, et al., 2021) Note-by-note cooking, first imagined in the mid-1990s by Hervé This proposed that, like how a musician makes a musical piece “note-by-note” a dish can be achieved with the use of pure compounds such as proteins and lipids rather than complex ingredients (This, 2014). This can have benefits in sustainability, for example, as it would not be necessary to have long supply chains for some ingredients, but they can be obtained on-site.

Parallel with these innovations in the kitchen, biotechnology has provided access to powerful technologies such as CRISPR/Cas9, a genome-editing tool that can introduce targeted, precise modifications to DNA sequences, composed of a CAS9 molecule as seen in Figure 1 (Pawluk et. Al, 2016). CRISPR-Cas9 has been discovered to possess immense potential in medicine to treat genetic diseases and in agriculture to improve crops (Jinek et al., 2012; Bortesi and Fischer, 2015).

This project wishes to combine these two pioneering disciplines: note-by-note cooking and gene editing, by creating a conceptual meal using CRISPR/Cas9 into the Crispy/Cas9 dish. Using pure compounds and innovative techniques through a symbolic presentation, the meal attempts to show that food can be used as a tool of scientific communication.

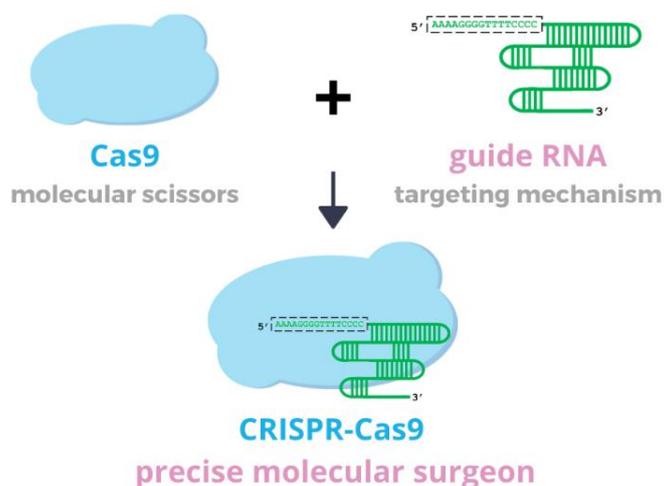


Figure 1. Components of CRISPR/Cas9 technology (Quah, 2021)

2. AIM AND OBJECTIVES

2.1 AIM

This assignment aims to present the ideation, development process, and result of a note-by-note dish inspired by the topic Food for the Future, specifically the gene editing technology CRISPR/Cas9.

2.2 OBJECTIVES

- Ideate a note-by-note dish that reflects the theme Food for the Future
- Formulate the note-by-note dish using pure compounds, aiming for an innovative yet indulgent outcome
- Use different technologies inspired by innovative and regular kitchen techniques
- Evaluate the dish through a sensory evaluation

3. MATERIALS AND METHODS

3.1 INGREDIENTS

Table 1 shows the ingredients and pictures used to formulate the dish:

Table 1. Ingredient list

Ingredient	Brand	Picture
Sucrose (Caster and icing sugar)	Gem	
Wheat starch	Foo Lung Ching Kee	
Wheat gluten	Biotiva	
Sodium Bicarbonate	Gem	

<p>Vegetable oil (up to 80% oleic acid)</p>	<p>Mediterrani</p>	
<p>Vanilla flavoring</p>	<p>EuroVanille</p>	
<p>Passion fruit flavoring</p>	<p>Sosa</p>	
<p>Yellow coloring</p>	<p>Mallard Ferriere</p>	
<p>Red coloring</p>	<p>Mallard Ferriere</p>	
<p>Strawberry flavoring</p>	<p>MSK</p>	

Egg white powder	Louis Francois	
Water	NA	

3.2 MATERIALS PER DISH COMPONENT

3.2.1 STRAWBERRY COOKIES

Table 2 shows the weights and percentages used for the strawberry cookies:

Table 2. Ingredients strawberry cookies

Ingredient	Weight (g)	Percentage (%)
Vegetable oil	62	25,8
Egg white powder	10	4,2
Caster sugar	55	22,9
Vanilla extract	4	1,7
Wheat starch	100	41,7
Wheat gluten	8	3,3
Baking soda	1	0,4
TOTAL	240	100

3.2.2 CHIFFON CAKE

Table 3 shows the weights and percentages used for the chiffon cake:

Table 3. Ingredients for Chiffon Cake

Ingredient	Weight (g)	Percentage (%)
Vegetable oil	9	5,1
Egg white powder	27	15,2
Caster sugar	13,5	7,6
Vanilla extract	0,7	0,4
Wheat starch	4	2,3
Wheat gluten	1	0,6
Water	122	68,8
TOTAL	177,2	100

3.2.3 PASSION FRUIT GLAZE

Table 4 shows the weights and percentages used for the passion fruit glaze:

Table 4. Ingredients for sugar glaze

Ingredient	Weight (g)	Percentage (%)
Icing sugar	130	79,0
Water	34	20,7
Yellow coloring	0,164	0,1
Passion fruit flavoring	0,328	0,2
TOTAL	164,5	100

3.2.4 SUGAR NEST

Table 5 shows the weights and percentages used for the sugar nest:

Table 5. Ingredients for sugar nest

Ingredient	Weight (g)	Percentage (%)
Caste sugar	100	100
TOTAL	100	100

3.3 EQUIPMENT

Table 6 shows the equipment used during the kitchen trials:

Table 6. Equipment used for the dish

Equipment	Brand	Picture
Stove	DXCQ114418, Broderick's	
Stand mixer	Maxima with paddle attachment	
Microwave	Panasonic Pro II 1400	
Oven	Electrolux Skyline Premium	
Kitchen equipment: Bowls, plates, jars, sieves, whisks, scales	Varied	

3.4 METHODS

3.2.1 STRAWBERRY COOKIES

For the strawberry cookies, it was initially based on a roasted starch cookie recipe shown in the Note-by-note Cooking according to This (2014), however, it was drastically changed to the following recipe during the kitchen sessions:

1. Mix dry ingredients – Transfer the starch to a bowl and add gluten, sucrose, and egg white powder.
2. Add liquids – Pour in the oil, coloring, and water, then mix well in the stand mixer and medium speed.
3. Form the dough – Knead until a smooth dough form.
4. Shape cookies – Roll into small balls and flatten slightly into sticks.
5. Bake – Place on a baking sheet and bake at 160°C for 11 minutes.

3.2.2 CHIFFON CAKE

The chiffon cake was loosely based on a recipe shown in the Handbook of Molecular Gastronomy in the Cooking with olive oil, however, it was adapted for a note-by-note dish (Lavelle, 2021)

1. Mix egg white, oil, sugar, flour, and gluten.
2. Add it to the siphon and mix vigorously.
3. Add it to a paper cup and microwave for 45 seconds on high power.

3.2.3 PASSION FRUIT GLAZE

The passion fruit glaze was developed in the kitchen after trial and error to have an appropriate color and flavor:

1. Mix icing sugar with water and mix
2. Add flavour and color
3. Mix vigorously

3.2.4 SUGAR NEST

The sugar nest was developed in the kitchen after trial and error to have an appropriate appearance:

1. Heat sugar in a pan over medium heat until it melts and turns golden.
2. Add oil to the round part of a ladle and drop the melted sugar in the ladle, forming a nest. Let it dry and take it out carefully.

4. RESULTS

4.1 INITIAL IDEATION

An initial ideation stage was carried out, using the theme "Food for the Future" as the foundation for the dish. A preliminary concept sketch was created, as seen in Figure 2, where the gene-editing technology CRISPR/Cas9 was selected as the central inspiration to be interpreted through a note-by-note dish.

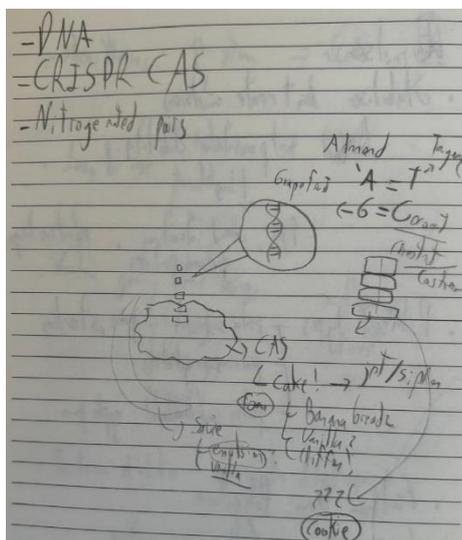


Figure 2. Draft of dish

The initial concept involved incorporating four distinct colors and flavors into the cookies to represent the four nitrogenous bases in a DNA strand. However, after conducting kitchen trials, it became evident that this approach could lead to clashing flavors and an overwhelming visual presentation, so a more simplified and cohesive design was adopted instead, keeping the vibrant and indulgent strawberry flavor with red color. For the chiffon cake, the idea was kept the same, adding a sugar nest to contrast the visual aspect and the texture. The initial crème anglaise was also changed to a more visually appealing sugar glaze with passion fruit flavor that matches the fruity flavor of the cookies.

4.2 FINAL PLATING

A final plating incorporating all the previously mentioned elements was done, trying to keep a balance in the plate that could engage customers, as seen in Figure 3:

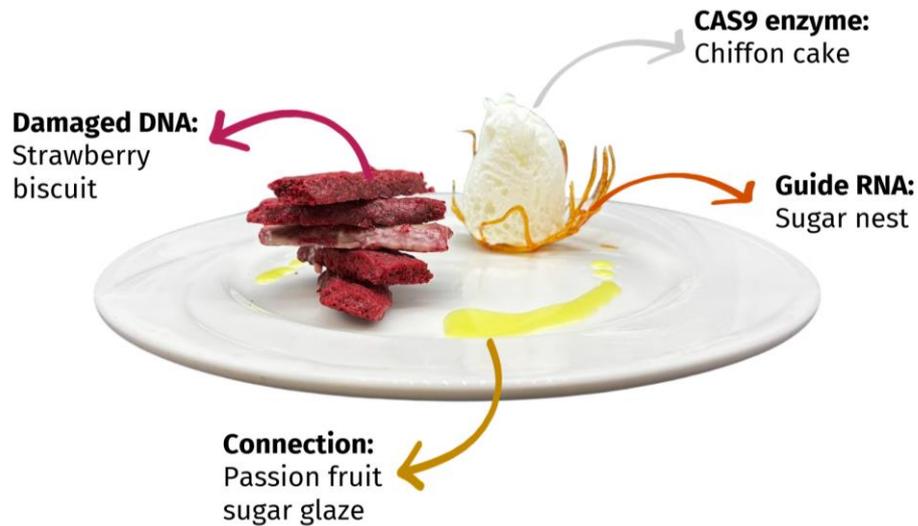


Figure 3. Final plating and elements

The dish is composed mainly of four elements that, as previously mentioned, correlate to one element of the CRISPR/Cas9 technology:

1. **Strawberry cookies:** Represent the defective DNA strand, highlighted by a different cookie coated in passion fruit glaze, emphasizing the idea of mutation and gene editing.
2. **Chiffon cake:** Symbolizes the Cas9 enzyme that binds to the target DNA strand.
3. **Sugar nest:** Represents the guide RNA, which directs the Cas9 to the sequence that will be edited.
4. **Passion fruit glaze:** Symbolizes the connection of the enzyme and the DNA strand.

4.2 SENSORY RESULTS

The dish was evaluated through a sensory evaluation survey at the TU Dublin kitchen with 10 untrained panelists. They were asked mostly to 9-point hedonic and opinion-based questions:

They were first asked their opinion on appearance and flavour with a 9—point hedonic test, with 1 being dislike extremely and 9 like extremely. The answers were averaged as seen in Figure 4:

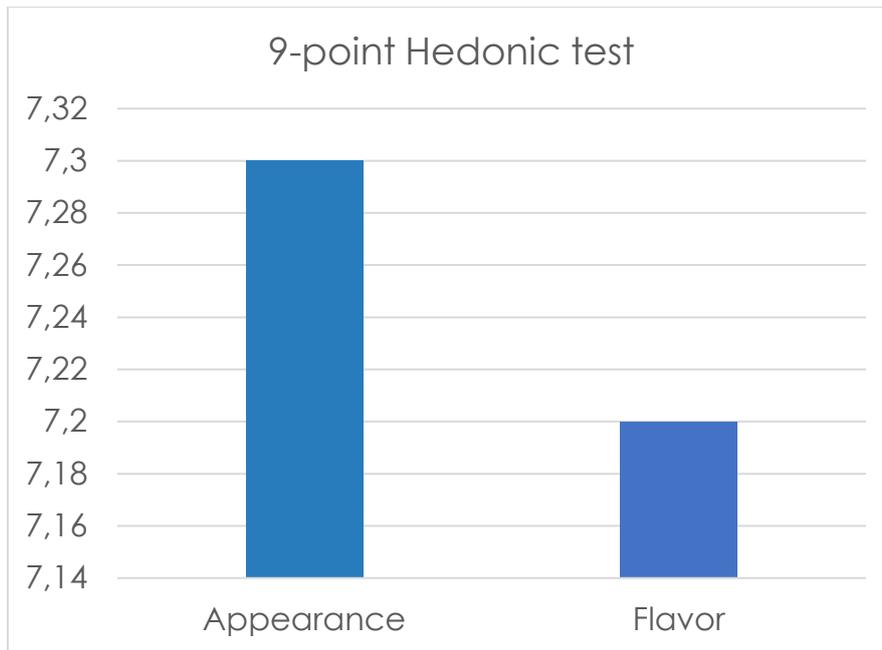


Figure 4. 9-point hedonic test

Figure 5 shows the participants' opinion regarding the visual appeal of the dish:

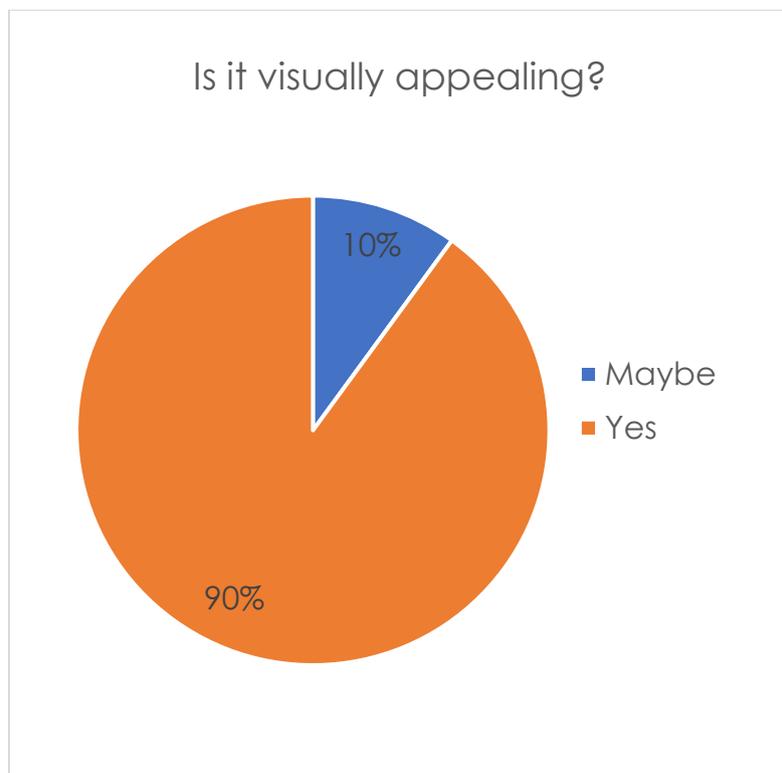


Figure 5. Is it visually appealing?

Later, they were asked about the interaction of the elements, as seen in Figure 6:

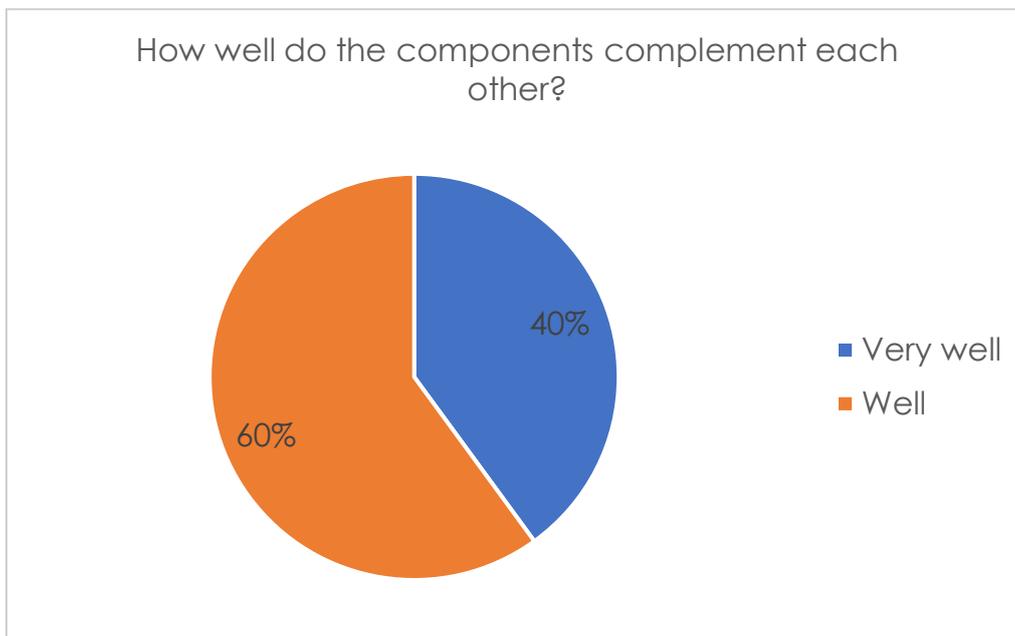


Figure 6. How well do the chiffon cake, cookie, glaze, and sugar nest components complement each other?

They were asked as well about the resemblance of a DNA plus another molecule, as Figure 7 shows:

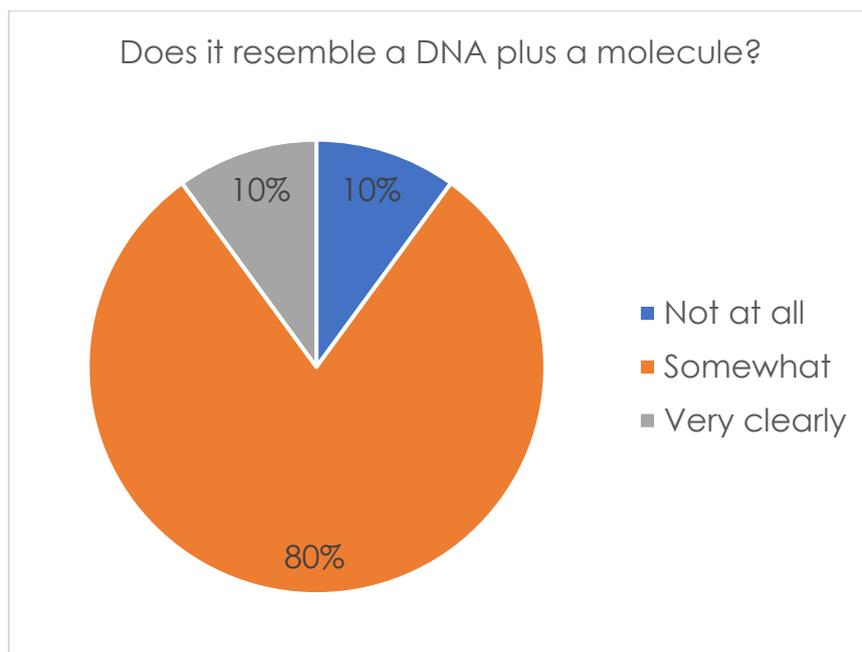


Figure 7. Does it resemble a DNA plus one molecule?

Finally, there was an open space for observations where just one participant commented: "Colours and flavours and taste are good"

5. DISCUSSION

5.1 Overall dish:

The making of a note-by-note dish was an interesting challenge, as it is not possible to use standard recipes one may find in cookbooks or on the internet. The procedures must be adapted to use only compounds in appropriate ratios. The use of “only pure compounds” is a challenge, as it is very difficult to find only the molecules that give the predominant characteristic of a substance, such as furaneol for the strawberry flavor (Schwab, 2013). In the present case, the approach was to use as close as it was possible to access pure compounds, such as vegetable oil, which is a mixture of many fatty acids, such as linoleic and oleic acid, being the oleic acid the one in highest percentage in some refined sunflower oils (Codex Alimentarius, 2019).

As mentioned before, the dish was composed of 4 elements representing the CRISPR/Cas9 technology, with each of them having different challenges and outcomes:

5.2 Strawberry cookies

The making of the cookies was challenging as no flour was used, but a mixture of starch and gluten, the main components of normal wheat flour. The ratios are varied and depend on the origin and process of the grain, with other components such as fats and proteins being part of the matrix. In our case, it was done with an 8% percentage of gluten of the total amount of starch, compared to a normal percentage of gluten of around 16% as mentioned by Bodor et al (2024), to avoid a bread-like dough. This was proved to be correct as after the mixing, the gluten had developed in the dough, but still allowed to knead and shape the cookies.

The cookie has compounds considered additives, such as the red coloring and baking soda. The functionality of these ingredients is indicated in the Regulation (EC) No 1333/2008, Annex 1. The Annex II gives the E number of the approved additives and indicates the specific maximum level. In this case, the additives indicate **quantum satis**, meaning it is used without a specific maximum limit, if it is used at the lowest level necessary to achieve its intended function and does not mislead consumers or pose a safety risk. This was the case for the strawberry cookies, where the color and raising agents were added just to achieve their intended purposes in small quantities. Food flavourings are not considered additives in the European Union and have specific regulations regarding maximum quantities considering their components, as seen in Regulation (EC) No. 1334/2008 Annex III of

however, in the present case the flavoring used do not seem to be part of this restricted list so there is not a set limit.

The cookie obtained has a fruity flavor and a vibrant red color, achieved by adding it in the mixing stage. The color was maintained even after the baking. One of the cookies was coated with the passion fruit glaze.

5.3 Chiffon cake

The chiffon cake was mostly unchanged during the kitchen sessions as it came as wished from the beginning. It is light and airy, contrasting with the denseness of the cookies, even though they are made with mostly the same ingredients through a different process, like how DNA is a building block to humans. It had significantly more water than the cookie to allow it to be runny to be added to the siphon afterwards. The siphon created a stable foam that was microwaved immediately to keep the bubbles formed. The final taste was mildly sweet, a stark difference from the cookies that were much more flavorful. Regarding additives and coloring, it follows the same principles as the cookies to follow the regulations.

5.4 Sugar nest

It was the last element added to give a better visual appeal and texture contrast from the cookie and cake. The making was very straightforward, just needing heating in a pan and precision to drizzle the ladle to form the round shape. The final product was sweet and crunchy, adding a gourmet element to the dish.

5.5 Passion fruit glaze:

It was also straightforward in the making, needing only mixing. Some sugar glazes are heated close to boiling to be added to cookies to let them set faster. In the present case, it was just used in its liquid form as decoration, so a cold process was done. Its sweetness and slightly acidic taste contrast with the overall sweetness of the dish. Similar to the cookies and cake, it followed the regulations regarding additives and colors.

5.6 Final sensory evaluation

The survey showed that the 10 participants had a positive opinion regarding the dish. The appearance and texture were valued in the hedonic scale close to the category "Like moderately", with the appearance being the most liked parameter, as seen in Figure 4. It is confirmed with the next question shown in Figure 5 were 90% of them indicated they found the dish visually appealing.

Regarding how well the elements complemented each other, it was also positive, with all of them agreeing they complemented very well (40%) and well (60%). This shows that the elements of the dish were successfully ideated, formulated, and presented to the participants. One point to improve could be the resemblance to a DNA double helix and a molecule, as only 10% mentioned it was very clearly appreciated, with the majority (80%) indicating it somewhat resembles. This can be later improved by altering the color and shape of the cookies to resemble a DNA. The final observation confirms, however, the positive impression of the consumers, where it indicated that the colors and flavors were good.

6. CONCLUSIONS

A successful dish inspired by the topic “Food for the Future” and the gene-editing technology of CRISPR/Cas9 was successfully created using note-by-note cooking, using mostly pure compounds and innovative technologies. The dish was positively appreciated by consumers through the sensory evaluation, highlighting its creativity and uniqueness in portraying a symbolic interpretation of gene editing through edible components that reflect the precision, interaction, and transformation processes in CRISPR technology, which has been proven to be very promising in medical applications.

This approach not only highlights the creative potential of molecular gastronomy but also encourages public engagement with complex scientific themes through food. The result demonstrates how note-by-note cooking can serve as a platform for both culinary innovation and science communication. Note-by-note cooking, as well as the CRISPR technology, represents an exciting and novel way of creating solutions for our modern society.

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8. APPENDIX

8.1 Logbooks

All logbooks are included for the four weeks of kitchen trials, following:

Table 7. Logbooks list

Logbook number	Date	Activity done
1	18/03/2025	First trial of cookies
2	25/03/2025	Second trial of cookies First trial of chiffon cake First trial of plating
3	31/03/2025	Third trial of cookies Second trial of chiffon cake First trial of glaze Second trial of plating
4	7/04/2025	Final trial of cookies Final trial of chiffon cake Final trial of glaze Final trial of sugar nest Final trial of plating

MODULE CODE: TFPD9022

MODULE TITLE: Food Prototype Development and Evaluation

STUDENT NAME: Johan Quintero

FOOD PRODUCT: CrispyCAS9

WEEK NO.: 1

DATE: 18/03/2025

Weekly Aims and Objectives

1. Make the first approach of note-by-note cookies

Materials and Method (Ingredients, Equipment and Method)

Ingredients:

COOKIES

Ingredient	Amount (g)
Wheat starch	46
Gluten	4
Sucrose	25
Oil	15
Water	5
Egg white powder	9
TOTAL	103,18

Equipment:

- Oven

Method:

Cookies:

1. Mix dry ingredients – Transfer the roasted starch to a bowl and add gluten, sucrose, and egg white powder.
2. Add liquids – Pour in the oil and water, then mix well.
3. Form the dough – Knead until a smooth dough form.
4. Shape cookies – Roll into small balls and flatten slightly.
5. Bake – Place on a baking sheet and bake at 220°C (425°F) for 10 minutes.

Results and discussion

A note-by-note cookie was first attempted, taking inspiration from the book Note-by-note Cooking by Hervé This, for a recipe for roasted flour cookies with corn starch (This, 2014). This recipe was altered to use wheat starch without roasting. However,

the quantities in the book are not indicated, so some assumptions were made. This left, however, a very dry and brittle dough, which was difficult to spread on the baking paper. Because of the low percentage of liquids in the formulation and the high baking temperature of 220°C, the final product caramelized in the oven, resulting in a brown appearance and a hard texture, as seen in Figure 1.



Figure 1. First trial of cookies

A second attempt was made, changing the baking time to 160°C for 11 minutes (standard time and temperatures for cookies), adding 2% of lecithin as emulsifier, increasing the amount of water and oil used, and changing the shape of sucrose (from caster sugar to icing sugar) shown in Table 1.

Table 1. Second trial of cookies

Ingredient	Amount (g)
Wheat starch	92
Gluten	7,4
Sucrose (icing sugar)	50
Oil	40
Water	20
Egg white powder	17
Soy lecithin	2
TOTAL	228,4

This left a much more stable dough that was able to have some stretch. The dough was left to rest for a bit and was shaped in the baking tray and baked at the indicated temperature. The final product was much softer, with a white-pale colour and a slightly sweet taste. For next trials, the use of vanilla flavouring is advised to enhance the overall product.



Figure 2. Second trial of cookies

Conclusions

It is challenging to make a note-by-note cookie as it is difficult to adapt the ratios of normal products (wheat flour, eggs, butter) into note-by-note ingredients. However, this allows for an interesting window to create many products with different properties. For the trial done today, stable cookie dough and cookies were achieved by replacing commonly used ingredients.

Recommendations for the following week.

Addition of vanilla flavouring to enhance the taste of the product. Do the glaze and test its interaction with the cookie

Ingredients required for the following 2 weeks.

Same as last week

MODULE CODE: TFPD9022

MODULE TITLE: Food Prototype Development and Evaluation

STUDENT NAME: Johan Quintero

FOOD PRODUCT: CrispyCAS9

WEEK NO.: 2

DATE: 25/03/2025

Weekly Aims and Objectives

1. Make the second approach of note-by-note cookies
2. Make the first approach of the chiffon cake

Materials and Method (Ingredients, Equipment and Method)

Ingredients:

COOKIES

Ingredient	Weight (g)
Vegetable oil	62
Egg white powder	10
Caster sugar	55
Vanilla extract	4
Wheat starch	100
Wheat gluten	8
Baking soda	1

CHIFFON CAKE

Ingredient	Weight (g)
Vegetable oil	12
Egg white powder	36
Caster sugar	18
Vanilla extract	0,7
Wheat starch	5
Wheat gluten	1
Water	122

Equipment:

- Oven

Method:

Cookies:

1. Mix dry ingredients – Transfer the roasted starch to a bowl and add gluten, sucrose, and egg white powder.
2. Add liquids – Pour in the oil and water, then mix well.
3. Form the dough – Knead until a smooth dough forms.
4. Shape cookies – Roll into small balls and flatten slightly.
5. Bake – Place on a baking sheet and bake at 160°C for 11 minutes.

Chiffon cake:

1. Mix egg white, oil, sugar, flour, and gluten
2. Add it to the siphon and mix vigorously
3. Add it to a paper cup and microwave for 45 seconds in high heat

Results and discussion

A note-by-note cookie was attempted by improving last session's ingredients and baking time.



Figure 1. Left: cookies before baking Right: Cookies after baking

The baking time was adjusted to a lower setting, leading to a better overall appearance and texture of the cookie. The dough was brittle and oily, but after baking was soft and chewy, as seen in Figure 1. Subsequently, the note-by-note cake was prepared with similar ingredients, varying the ratios of water and oil, leaving a much runnier texture as shown in Figure 2. It was added to the siphon and microwaved, where it increased its volume, leaving a foamy appearance. The flavour was relatively plain so for next trials the flavour must be improved.



Figure 2. Top: Chiffon cake before baking Bottom: Chiffon cake after baking

Finally, In Figure 3 the plating was done by cutting the cookies into batons and stacking them up resembling a DNA helix next to the chiffon cake representing the CRISPR CAS9 molecule.



Figure 3. Final plating

Conclusions

An appropriate formulation of note-by-note cookies and chiffon cake was achieved. The size of the cookies must be improved to obtain thinner cookies that can be stacked up more easily and resemble the DNA helix. For the chiffon cake, the flavour must be improved.

Recommendations for the following week.

Addition of vanilla flavouring to enhance the taste of the cake. Improve the cookie size to be able to stack up and develop the glaze.

Ingredients required for the following 2 weeks.

Same as last week

MODULE CODE: TFPD9022

MODULE TITLE: Food Prototype Development and Evaluation

STUDENT NAME: Johan Quintero

FOOD PRODUCT: CrispyCAS9

WEEK NO.: 3

DATE: 31/03/2025

Weekly Aims and Objectives

1. Make the third approach of note-by-note cookies
2. Make a second approach to chiffon cake
3. Make the first approach to the glaze
4. Design the plating with all the elements

Materials and Method (Ingredients, Equipment and Method)

Ingredients:

COOKIES

Ingredient	Weight (g)
Vegetable oil	62
Egg white powder	10
Caster sugar	55
Vanilla extract	4
Wheat starch	100
Wheat gluten	8
Baking soda	1

CHIFFON CAKE

Ingredient	Weight (g)
Vegetable oil	12
Egg white powder	36
Caster sugar	18
Vanilla extract	0,7
Wheat starch	5
Wheat gluten	1
Water	122

Glaze

Ingredient	Weight (g)
Icing sugar	130
Water	34

Flavour and color	Drop by drop
-------------------	--------------

Equipment:

- Oven

Method:**Cookies:**

1. Mix dry ingredients – Transfer the roasted starch to a bowl and add gluten, sucrose, and egg white powder.
2. Add liquids – Pour in the oil and water, then mix well.
3. Form the dough – Knead until a smooth dough forms.
4. Shape cookies – Roll into small balls and flatten slightly.
5. Bake – Place on a baking sheet and bake at 160°C for 11 minutes.

Chiffon cake:

1. Mix egg white, oil, sugar, flour, and gluten
2. Add it to the siphon and mix vigorously
3. Add it to a paper cup and microwave for 45 seconds in high heat

Results and discussion

The note-by-note cookies and chiffon cake were done again following last week's recipe. The chiffon cake was improved by adding vanilla flavoring and cookies were done in baton formed, as seen in Figure 1.



Figure 1. Baton cookies

Cold glaze was done following the recipe indicated before, to coat the cookies and to be used as decoration. Different colors and flavors were tested; however, it can be seen in Figure 2 that color green and yellow are very similar to one another, so for the next trials, red and yellow can be kept as the sole colors to use.



Figure 2. Glaze preparation

A final plating was done as shown in Figure 3 by incorporating the chiffon cake, the cookies covered in glaze, and the decoration. The colors in the cookies are not as bright as expected, so the addition of the colorant in the mixing phase can be explored. Also, the size of the cookies was better than last session, but they can still be thinner to achieve the desired effect. The flavour of the cake was better as the Vanilla flavoring was added.



Figure 3. Plating

Conclusions

An appropriate formulation of note-by-note cookies and chiffon cake was achieved again. The size of the cookies must still be improved to obtain thinner cookies that can be stacked up more easily and resemble the DNA helix. Also, the glaze can be improved to have a more vivid appearance.

Recommendations for the following week.

Inclusion of a sugar net to add more elements to the plating. Improve the appearance of the cookie and the glazing.

Ingredients required for the following 2 weeks.

Same as last week

MODULE CODE: TFPD9022

MODULE TITLE: Food Prototype Development and Evaluation

STUDENT NAME: Johan Quintero

FOOD PRODUCT: CrispyCAS9

WEEK NO.: 4

DATE: 7/04/2025

Weekly Aims and Objectives

1. Make the final version of note-by-note cookies
2. Make the final version of the chiffon cake
3. Make the final version of the sugar nest
4. Evaluate product through sensory analysis survey

Materials and Method (Ingredients, Equipment and Method)

Ingredients:

COOKIES

Ingredient	Weight (g)
Vegetable oil	62
Egg white powder	10
Caster sugar	55
Vanilla extract	4
Wheat starch	100
Wheat gluten	8
Baking soda	1

CHIFFON CAKE

Ingredient	Weight (g)
Vegetable oil	9
Egg white powder	27
Caster sugar	13.5
Vanilla extract	0,7
Wheat starch	4
Wheat gluten	1
Water	122

Glaze

Ingredient	Weight (g)
Icing sugar	130
Water	34

Flavour and color	Drop by drop
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Sugar nest

Ingredient	Weight (g)
Caster sugar	100

Equipment:

- Oven

Method:

Cookies:

1. Mix dry ingredients – Transfer the roasted starch to a bowl and add gluten, sucrose, and egg white powder.
2. Add liquids – Pour in the oil and water, then mix well.
3. Form the dough – Knead until a smooth dough forms.
4. Shape cookies – Roll into small balls and flatten slightly.
5. Bake – Place on a baking sheet and bake at 160°C for 11 minutes.

Chiffon cake:

1. Mix egg white, oil, sugar, flour, and gluten
2. Add it to the siphon and mix vigorously
3. Add it to a paper cup and microwave for 45 seconds in high heat

Glaze:

1. Mix icing sugar with water and mix
2. Add flavour and color

Sugar Nest:

1. Heat sugar in a pan over medium heat until it melts and turns golden.
2. Add oil to the round part of a ladle
3. Drop the melted sugar in the ladle, forming a nest. Let it dry and take it out carefully

Results and discussion

A final version of the cookies, chiffon cake, and glaze was done with the addition of a sugar nest. For the cookies, red coloring and strawberry were used to keep a simpler yet elegant design. The coloring was added directly to the liquid ingredients before mixing. This allows for obtaining a vibrant color without adding the glaze on top, as

the last session proved it gave a dull appearance. In the case of the chiffon cake and the glaze, the recipe was kept the same as in the previous session. For the glaze, just the passion fruit flavour and yellow were kept. It was added to one of the cookies to simulate a defective DNA part. The sugar nest was added to simulate part of the CRISPR/CAS9 molecules as seen in Figure 1.



Figure 1. Final plating

A sensory analysis was done with participants from the TU Dublin kitchens. These results can be seen in the Result section of the report.

Conclusions

A final and appropriate formulation of note-by-note CRISPR/CAS9 inspired dish was made, composed of strawberry cookies resembling a DNA strand, a chiffon cake and a sugar nest resembling the CAS9 enzyme with passion fruit glaze as decoration. It was possible to achieve similar results with note-by-note ingredients for a gourmet dish as it could have been achieved with regular ingredients.

Recommendations for the following week.

Flash presentation and report

Ingredients required for the following 2 weeks.